

REMARKS

The present amendment is prepared in accordance with the new revised requirements of 37 C.F.R. § 1.121. A complete listing of all the claims in the application is shown above showing the status of each claim. For current amendments, inserted material is underlined and deleted material has a line therethrough.

Applicants appreciate the thoroughness with which the Examiner has examined the above-identified application. Reconsideration is requested in view of the amendments above and the remarks below.

Claims 1, 3, 9, 10, 14-19, 21-24, 29 and 30 have been amended.

Claims 4, 5, 7 and 8 have been canceled.

Claims 31-34 have been added.

No new matter has been added.

The Drawings

The Examiner has objected to the drawings stating that the drawings must show every feature of the invention specified in the claims. Applicants submit that in view of the amendments to the claims, the objections to the drawings are now moot.

No new matter has been added.

Claim Rejections and Objections

The Examiner has rejected claims 1 and 5 under 35 U.S.C. 112, first paragraph, as containing subject matter that was not described in the specification in such a way as to

enable one skilled in the art to make and/or use the invention. Claims 1 and 5 have been amended to clarify that the claimed monolithic pellicle has two regions of different thickness. In view of the foregoing amendments, it is submitted that the rejections of claims 1 and 5 are now moot.

The Examiner has also objected to claims 1-29 for various informalities. Applicants have amended to claims to overcome such informalities, and as such, submit that the objections to claims 1-29 are now moot.

No new matter has been added.

Claim Rejections - 35 USC§ 102

Claims 1-4, 6, and 9-15

The Examiner has rejected claims 1-4, 6, and 9-15 under 35 U.S.C. 102(b) as being anticipated by Satoh et al (U. S. Patent No. 5,847,489). Applicants disagree.

Amended independent claim 1, from which now pending claims 2, 3, 6, and 9-15 depend, is directed to an optical pellicle that comprises a transparent plate having a recessed portion and a perimeter. The recessed portion has a first thickness, while the perimeter has a second thickness ranging from about 3mm to about 6mm. The perimeter entirely surrounds the recessed portion such that the transparent plate is a monolithic optical pellicle. Also, a plurality of openings traverse through the perimeter for introducing a gas flow over the recessed portion upon mounting the monolithic optical pellicle to a photomask. Support for the amendments to claim 1 can be found at least in originally filed claims 7, 8 and 16.

Applicant submits that the present invention is not anticipated by Satoh et al. Anticipation is but the ultimate or epitome of obviousness. To constitute anticipation, all material elements of a claim must be found in one prior art source. *In re Marshall*, 577 F.2d 301, 198 USPQ 344 (CCPA 1978).

Satoh et al. is directed to a piezoelectric device that includes a piezoelectric plate with first and second plates, each made of an ionic material and having recessed portions, to cover electrodes on each face of the piezoelectric plate. (Abstract.) It teaches a quartz crystal resonator that includes quartz as a piezoelectric material for the resonator and an ionic material for package members. (Col. 6, ll. 46-58, Figs. 1 and 2c.) These ionic materials include quartz, aluminum oxide, and glass. (Col. 7, ll. 10-15.) Satoh does not teach that the first and second plates have to be transparent. Rather, it teaches that these first and second plates may be non-transparent materials (e.g., aluminum oxide). Accordingly, applicants submit that Satoh et al. teaches away from the present invention.

Further, Satoh et al. teaches that the quartz crystal resonator includes quartz plate 101, that resonates at frequencies determined by the thickness and the elastic constant thereof, a covering quartz plate 102, electrodes 106 and 107 within the plate 101, a base quartz plate 103, and through-holes 801 and 802. (Col. 6, ll. 59-64 and col. 7, ll. 22-37, Figs. 1 and 2c.) These through-holes 801 and 802 are formed in the covering plates 102 and 103, whereby each through-hole 801 and 802 is filled with a conductive material such as metal. (Col. 7, ll. 28-32.) Satoh et al. does not teach or suggest a monolithic optical pellicle that includes a recessed portion and a perimeter having a thickness ranging from about 3mm to about 6mm surrounding the recessed portion, whereby the perimeter

includes a plurality of openings for introducing a gas flow over the recessed portion upon mounting the monolithic optical pellicle to a photomask, as is currently claimed.

Accordingly, applicants submit that the claims of the instant invention include limitations not disclosed nor contemplated by Satoh et al. such that Satoh et al. does not anticipate nor render obvious the instant invention.

Claims 1-4, 6, 9-15, 18-22, 24-25

The Examiner has also rejected claims 1-4, 6, 9-15, 18-22, 24-25 under 35 U.S.C. 102(b) as being anticipated by Nistler et al (U. S. Patent No. 6,410,191).

Again, amended independent claim 1, from which now pending claims 2, 3, 6, and 9-15 depend, is directed to an optical pellicle that comprises a transparent plate having a recessed portion and a perimeter. The recessed portion has a first thickness, while the perimeter has a second thickness ranging from about 3mm to about 6mm. The perimeter entirely surrounds the recessed portion such that the transparent plate is a monolithic optical pellicle. Also, a plurality of openings traverse through the perimeter for introducing a gas flow over the recessed portion upon mounting the monolithic optical pellicle to a photomask.

Amended independent claim 18, from which claims 19-22 and 24-25 depend, is directed to a method of forming an optical pellicle. The method includes providing a pellicle plate of a transparent material having a first thickness ranging from about 3mm to about 6mm. A portion of the transparent material is removed to transform the pellicle plate into a monolithic optical pellicle that includes a recessed portion having a

second thickness, which is less than the first thickness, and a perimeter frame that entirely surrounds and is integrally formed with the recessed portion of the pellicle plate.

Nistler et al. does not anticipate the present invention. Nistler et al. is limited to forming a photomask. (Abstract.) It discloses forming a phase-shift mask 20 having a phase-shifting region by forming a trench 22 in the photo-mask substrate 12. This is done by depositing chromium traces 24 of appropriate width and separation and etching the vertical trench 22 in the photo-mask substrate 12 in the region defined between adjacent traces 24. (Col. 1, ll. 13-23, and Fig. 1A.) The depth of the trench 22 is selected to provide a 180 degree phase shift, and the width of the trench 22 is less than the wavelength of the incident radiation. Figure 1C shows a chromeless phase-shift mask 30, whereby chromium traces 32 are used to define the trench 22 and are subsequently removed. (Col. 2, ll. 1-3.) A null region used to pattern the feature on the wafer forms below the phase edge 26. (Col. 2, ll. 3-6.)

Nistler does not disclose an optical pellicle, or a method of forming such optical pellicle, that includes a transparent plate having a recessed portion of a first thickness and a perimeter surrounding the recessed portion having a thickness ranging from about 3mm to about 6mm, as is currently claimed. Nistler et al. also does not disclose a plurality of openings traversing through the perimeter for introducing a gas flow over the recessed portion upon mounting the monolithic optical pellicle to a photomask as claimed. In view of the foregoing, it is submitted that Nistler et al. does not anticipate nor render obvious the instant invention.

Claim 30

The Examiner has rejected claim 30 under 35 U.S.C. 102(e) as being anticipated by Shu (U. S. Patent No. 6,842,228). Applicants disagree.

Amended independent claim 30 is directed to a method of protecting a photomask during photolithography. The method includes providing a photomask and attaching a monolithic one-piece optical pellicle to the photomask for protecting the photomask during subsequent photolithography processing. This monolithic one-piece optical pellicle has a recessed portion with a thickness ranging from about 200 μ m to about 900 μ m and a frame with a thickness ranging from about 3mm to about 6mm.

Applicants submit that Shu is a conventional prior art reference at which the present invention is aimed at overcoming, namely, it is directed to fusing a pellicle to a frame (i.e., it is a two-piece article). (Abstract, claim 1, Col. 2, ll. 47-60, and Fig. 1.) (See, Applicants' Specification at paragraphs [0007]-[0009].) Shu discloses fusing the pellicle to the frame using a focused beam 145 directed to the seam where the pellicle 110 and the frame 120 meet. (Col. 3, ll. 14-33.) On the contrary, the claimed pellicle is a monolithic one-piece optical pellicle, not a pellicle fused to a frame as disclosed in Shu, that is attached to the photomask, such that the claims of the instant invention include limitations not disclosed nor contemplated by Shu.

Moreover, Shu recites that with the use of shorter wavelength lithography, such as 157 nm, thicker, rigid pellicles ranging from 300 to 1,000 microns thick have been used, however, the effects on the focused image of distortion from the pellicle may be significant. As such, it is submitted that the Shu patent teaches away from the use of

thicker, rigid pellicles, such as those having a recessed portion with a thickness ranging from about 200 μ m to about 900 μ m and a frame with a thickness ranging from about 3mm to about 6mm, as is claimed.

It is for these reasons that applicants submit that Shu does not anticipate nor render obvious the instant invention.

Claim Rejections - 35 USC § 103

The Examiner has rejected claim 5 under 35 U.S.C. 103(a) as being unpatentable over Satoh et al OR Nistler et al., and claims 7 and 16-17 under 35 U.S.C. 103(a). as being unpatentable over Satoh et al in view of Okada et al (U. S. Patent No. 6,744,562)., and claims 7, 16-17, 23 and 27-29 under 35 U.S.C. 103(a) as being unpatentable over Nistler et al in view of Okada et al. Applicants disagree.

Claim 5

Firstly, it is submitted that since claim 5 has been canceled, the rejection thereof is now moot.

Claims 7, 16-17, 23 and 27-29 and Claim 8

The Examiner has rejected claims 7 and 16-17 under 35 U.S.C. 103(a) as being unpatentable over Satoh et al in view of Okada et al (U. S. Patent No. 6,744,562), and claims 7, 16-17, 23 and 27-29 as being unpatentable over Nistler et al. in view of Okada et al.

Claim 7 has been canceled.

As discussed above, claim 1 and claims 16-17 dependent thereon are directed to a transparent plate having a recessed portion with a first thickness, and a perimeter with a second thickness ranging from about 3mm to about 6mm that surrounds the recessed portion such that the transparent plate is a monolithic optical pellicle. A plurality of openings traverse through the perimeter for introducing a gas flow over the recessed portion upon mounting the monolithic optical pellicle to a photomask. As recited in claim 16, air filters may reside within the plurality of openings, and as recited in claim 17, the openings may be circular, oval, rectangular, square or even combinations thereof.

Independent claim 18 and claims 23 and 27-29 dependent thereon are directed to a method of forming an optical pellicle by providing a pellicle plate of a transparent material having a first thickness ranging from about 3mm to about 6mm, and removing a portion thereof to transform the plate into a monolithic optical pellicle. This monolithic optical pellicle includes a recessed portion that has a second thickness less than the first thickness, and a perimeter frame that entirely surrounds and is integrally formed with the recessed portion. Dependent claim 23 recites that the standoff distance between the monolithic optical pellicle and a photomask to which the pellicle is to be mounted to is adjusted for by removing a predetermined thickness from the perimeter frame. Claims 27-29 further recite that a plurality of openings may be formed in the perimeter frame for introducing a gas flow over the recessed portion of the pellicle plate.

With respect to the rejection of claims 16-17 over Satoh et al in view of Okada et al., it is again submitted that Satoh et al. is limited to a quartz crystal resonator that includes quartz as a piezoelectric material for the resonator and an ionic material for

package members, whereby the ionic materials include quartz, aluminum oxide, and glass. (Abstract, col. 6, ll. 46-64, col. 7, ll. 10-37, and Figs. 1 and 2C.) Applicant continues to submit that Satoh teaches away from the present invention since it discloses and teaches that the covering plates may be made of non-transparent materials (e.g., aluminum oxide). Further, it is submitted that Satoh et al. does not teach or suggest a monolithic optical pellicle that includes a transparent plate having a recessed portion and a perimeter having a thickness ranging from about 3mm to about 6mm surrounding the recessed portion, as is currently claimed.

The Examiner cites Okada et al. to overcome the deficiencies of Satoh et al, stating that Okada et al teaches an optical pellicle having a pellicle frame, wherein the frame has a size about 3 mm (please see column 4, lines 39-40) and a plurality of vent holes. It is the Examiner's position that it would have been obvious to one skilled in the art to apply the teachings of Okada et al to modify the monolithic covering plate to have the desired size and vent holes for the benefit of making it capably function as an optical pellicle for the benefit of covering up the photomask to protect the photomask during the lithographic process.

Applicants disagree and submit that Okada et al is another example of the prior art at which the present invention is directed at overcoming the problems associated therewith. In particular, Okada et al. discloses a two-piece pellicle having a box-shaped pellicle frame with top and bottom openings bonded to a pellicle sheet to cover one of the openings of the pellicle frame. (Abstract, col. 2, ll. 45-55 and col. 3, ll. 16-22.) Moreover, Okada et al. that the thickness of the pellicle frame is from 1mm to 3 mm, and that if it is

thicker than this, the resistance is likely to be high at the time of introduction of the inert gas, such that the flow of inert gas tends to be turbulent and difficult to carry out replacement efficiently. (Col.4, ll. 39-45.) That is, Okada et al. teaches away from the claimed invention of a one-piece monolithic optical pellicle having a frame with a thickness of about 3mm to about 6mm, which is a difference in kind and not in degree from the ranges disclosed in Okada et al.

"A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant . . . [or] if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant." *In re Gurley*, 27 F.3d 551, 553, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994). Applicants submit that upon reading the Okada et al patent, a person of ordinary skill would be discouraged from following the path taken by the applicants in providing a one-piece transparent monolithic optical pellicle that has a recessed portion (with a thickness from about 200 μ m to about 900 μ m) and a perimeter with a thickness ranging from about 3mm to about 6mm. It is the thickness of about 3mm to about 6mm of the perimeter of this one-piece monolithic optical pellicle that advantageously and unexpectedly provides sufficient rigidity to the pellicle to prevent any stresses and/or distortions thereto. (See, Specification, paragraphs [0036], [0037], [0051], and [0055].) *In re Rouffet*, 149 F.3d 1350, 1355, 47 USPQ2d 1453, 1456 (Fed. Cir. 1998); *In re Gurley*, 27 F.3d 551, 553, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994); *Monarch Knitting Machinery Corp.*, 139 F.3d at 877, 45 USPQ2d at

1984-85; *Gillette Co.*, 919 F.2d at 726, 16 USPQ2d at 1929, (In determining a case of obviousness, objective evidence of non-obviousness may include unexpected results achieved by the invention and the prior art's teaching away from or general skepticism of the direction taken by the inventor.)

As for the rejections of claims 16-17, 23 and 27-29 as being unpatentable over Nistler et al. in view of Okada et al., it is submitted that Nistler et al. only discloses a phase-shift mask 20 having a phase-shifting region and a chromeless phase-shift mask 30. (Col. 1, ll. 13-23, Col. 2, ll. 1-3, and Fig. 1A.) Nistler does not disclose or suggest an optical pellicle, or a method of forming such optical pellicle, that includes a transparent plate having a recessed portion of a first thickness and a perimeter surrounding the recessed portion having a thickness ranging from about 3mm to about 6mm, as is currently claimed. Again, Okada et al. teaches a two-piece pellicle, and it away from a pellicle frame thickness greater than 3mm since the resistance is likely to be high at the time of introduction of the inert gas, such that the flow of inert gas tends to be turbulent and difficult to carry out replacement efficiently. (Abstract, col. 2, ll. 45-55 and col. 3, ll. 16-22, and col.4, ll. 39-45.)

Accordingly, since Okada et al. in material respects teaches away from the instant invention, a *prima facie* case of obviousness under 35 USC §103(a) over Nistler et al. in view of Okada et al. can not be established.

Further, with respect to the limitations of canceled claim 8, which are now incorporated into amended claim 1, the Examiner states that Shu teaches for exposure laser source of wavelength 157 nm the thickness of the pellicle should be 300 to 1000 microns,

(col. 1, ll 48-52). In view of this, the Examiner states that it would then have been obvious to one skilled in the art to modify the thickness of the recessed portion to have the disclosed thickness for the benefit of making it best worked in the lithographic process using 157 nm laser light source.

However, applicants submit that Shu only discloses two-piece structures of a pellicle fused to a frame using a focused beam 145 directed to the seam where the pellicle 110 and the frame 120 meet. (Abstract, claim 1, Col. 2, ll. 47-60, Col. 3, ll. 14-33 and Fig. 1.) In fact, it recognizes the problems associated with rigid pellicles ranging from 300 to 1,000 microns thick in that they have significant effects on the focused image of distortion and that mechanical forces of adhesive attachment can introduce unacceptable distortion in the pellicle. (Col. 1, ll. 45-56.) Shu solves these problems by disclosing and teaching fusing a pellicle to a frame at a seam. (Abstract, claim 1, Col. 2, ll. 47-60, Col. 3, ll. 14-33 and Fig. 1.) It does not disclose, contemplate or even suggest a one-piece optical pellicle having a frame with a thickness ranging from about 3mm to about 6mm, as is currently claimed, whereby this frame of the claimed one-piece structure, and in particular its thickness, unexpectedly provides the resultant pellicle with sufficient rigidity to prevent any stresses and/or distortions to the resultant one-piece monolithic optical pellicle. (See, Specification, paragraphs [0036], [0037], [0051], and [0055].)

To establish a *prima facie* case of obviousness, there must be a suggestion or motivation in the prior art to combine the prior art references. *Monarch Knitting Mach. Corp. v. Sulzer Morat GmbH*, 139 F.3d 877, 882, 45 USPQ2d 1977, 1982 (Fed. Cir. 1998). "[T]he suggestion to combine may be found in explicit or implicit teachings within

the references themselves, from the ordinary knowledge of those skilled in the art, or from the nature of the problem to be solved." *WMS Gaming, Inc. v. International Game Tech.*, 184 F.3d 1339, 1355, 51 USPQ2d 1385, 1397 (Fed. Cir. 1999). However, there still must be evidence that "a skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed." *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1456 (Fed. Cir. 1998); see also *In re Werner Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000).

Applicants submit that there is no suggestion or motivation in Satoh et al., Nistler et al., Okada et al. or Shu, alone or in any proper combination thereof, that disclose a one-piece optical pellicle having a frame with a thickness ranging from about 3mm to about 6mm, whereby the thickness of this frame unexpectedly provides the resultant monolithic pellicle with sufficient rigidity to prevent any stresses and/or distortions to the resultant one-piece monolithic optical pellicle.

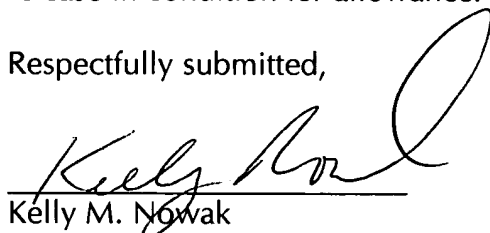
Rather, Satoh et al. teaches away from an optical pellicle since it teaches a piezoelectric device having plates that are not required to be transparent. (Abstract, col. 6, ll. 46-58, col. 7, ll. 10-32 and Figs. 1 and 2c.) Nistler et al. is merely directed to phase-shift masks and does not disclose any critical dimensions. Okada et al. outright rejects the use of a pellicle frame thicker than 1mm to 3 mm since such thicknesses cause the resistance to be high at the time of introduction of the inert gas, such that the flow of inert gas tends to be turbulent and difficult to carry out replacement efficiently. (Col.4, ll. 39-45.) See, *W. L. Gore & Assoc. v. Garlock, Inc.*, 721 F.2d 1540, 1550, 220 USPQ 303, 311

(Fed. Cir. 1983) (error to find obviousness where references "diverge from and teach away from the invention at hand"). Shu is limited to a two-piece structure of a pellicle fused to a frame at a seam. Applicants submit that neither Satoh et al., Nistler et al., Okada et al. or Shu, alone or in any proper combination thereof, teach, contemplate or suggest a one-piece monolithic optical pellicle that has a recessed portion and a perimeter having a thickness ranging from about 3mm to about 6mm surrounding the recessed portion, whereby the perimeter includes a plurality of openings for introducing a gas flow over the recessed portion upon mounting the monolithic optical pellicle to a photomask, as is currently claimed.

In the face of this, one skilled in the art, confronted with the same problems as the inventors and with no knowledge of the claimed invention, would not be expected to select the elements from the cited prior art references for combination in the manner claimed. *Rouffet*, 149 F.3d at 1357, 47 USPQ2d at 1456 (Fed. Cir. 1998); see also *Werner Kotzab*, 217 F.3d at 1371, 55 USPQ2d at 1317. Hindsight based on reading of the instant application cannot be used to aid in determining obviousness, nor can the motivation to provide a single pellicle structure with a frame thickness of about 3mm to about 6mm come from applicants' instant invention itself. *W.L. Gore*, 721 F.2d at 1553, 220 USPQ at 312-13; *Oetiker*, 977 F.2d at 1447, 24 USPQ2d at 1446. With no motivation or teaching to combine the teachings of the prior art, as well as with the evidence of teaching away, it would not impel persons skilled in the art to provide the instant invention, hence, the record supports a conclusion of nonobviousness. Any contrary conclusion would be based on hindsight.

It is respectfully submitted that the application has now been brought into a condition where allowance of the case is proper. Reconsideration and issuance of a Notice of Allowance are respectfully solicited. Should the Examiner not find the claims to be allowable, Applicants' attorney respectfully requests that the Examiner call the undersigned to clarify any issue and/or to place the case in condition for allowance.

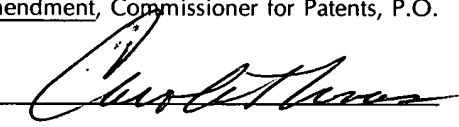
Respectfully submitted,


Kelly M. Nowak
Reg. No. 47,898

DeLIO & PETERSON, LLC
121 Whitney Avenue
New Haven, CT 06510-1241
(203) 787-0595

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service on the date indicated below as first class mail in an envelope addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Name: Carol M. Thomas Date September 8, 2005 Signature: 
ibmb100332000amdA